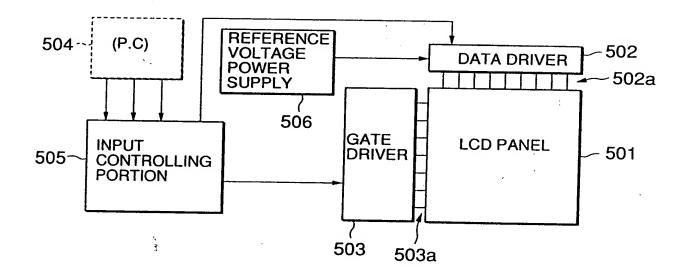
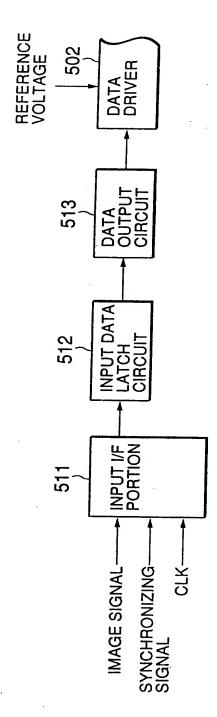
DISPLAY PANEL DRIVING METHOD, DISPLAY PANEL...
Hiraki et al. Our File No.: 1508.68361
Divisional of Serial No. 09/428,324
Greer, Burns & Crain, Ltd. (Patrick G. Burns) (312) 360-0080
Sheet 1 of 51

FIG. 1 (Prior Art)



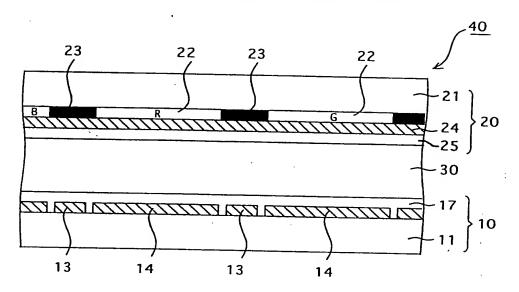




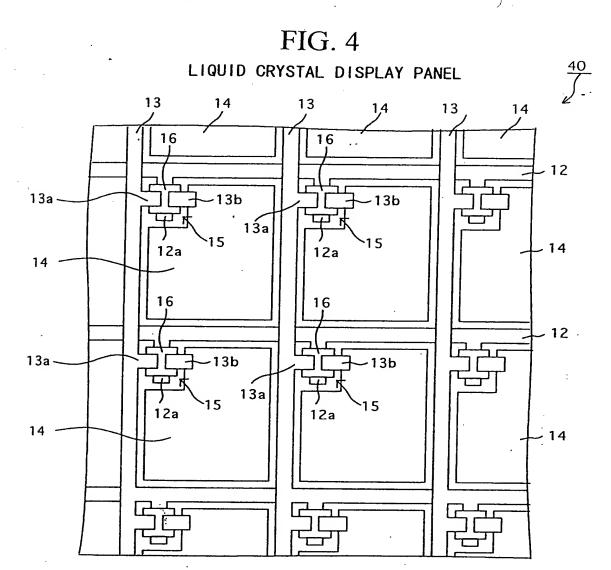
DISPLAY PANEL DRIVING METHOD, DISPLAY PANEL...
Hiraki et al. Our File No.: 1508.68361
Divisional of Serial No. 09/428,324
Greer, Burns & Crain, Ltd. (Patrick G. Burns) (312) 360-0080
Sheet 3 of 51

FIG. 3

SECTIONAL SHAPE OF LIQUID CRYSTAL PANEL

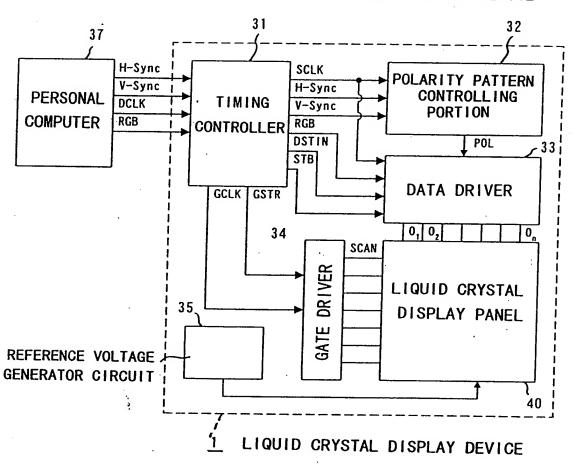


DISPLAY PANEL DRIVING METHOD, DISPLAY PANEL...
Hiraki et al. Our File No.: 1508.68361
Divisional of Serial No. 09/428,324
Greer, Burns & Crain, Ltd. (Patrick G. Burns) (312) 360-0080
Sheet 4 of 51



DISPLAY PANEL DRIVING METHOD, DISPLAY PANEL...
Hiraki et al. Our File No.: 1508.68361
Divisional of Serial No. 09/428,324
Greer, Burns & Crain, Ltd. (Patrick G. Burns) (312) 360-0080
Sheet 5 of 51

FIG. 5
CONFIGURATION OF LIQUID CRYSTAL DISPLAY DEVICE

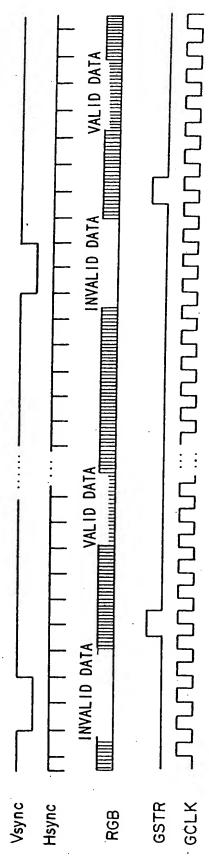


(Patrick G. Burns)

(312) 360-0080





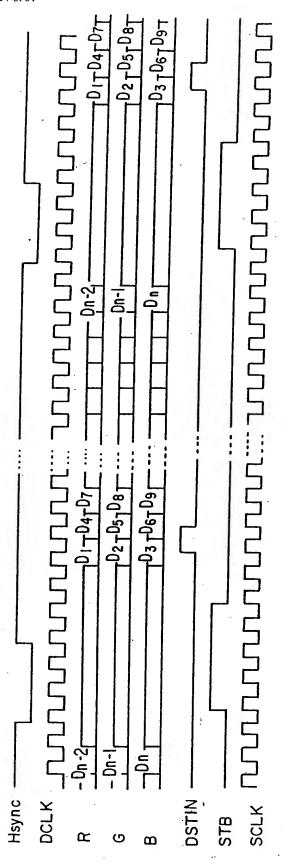


Greer, Burns & Crain, Ltd. (Patrick G. Burns) Sheet 7 of 51

(312) 360-0080

FIG 7

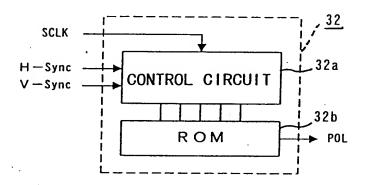
TIMING CHART (2)



DISPLAY PANEL DRIVING METHOD, DISPLAY PANEL...
Hiraki et al. Our File No.: 1508.68361
Divisional of Serial No. 09/428,324
Greer, Burns & Crain, Ltd. (Patrick G. Burns) (312) 360-0080
Sheet 8 of 51

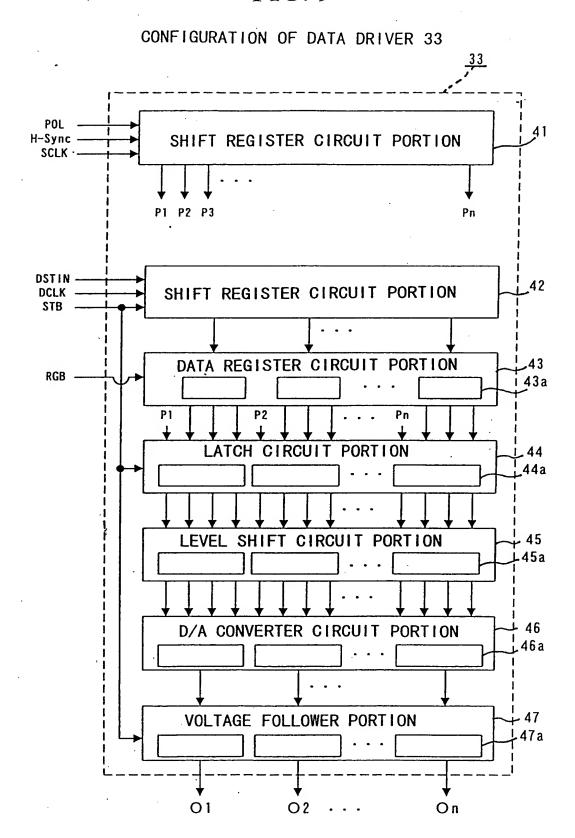
FIG. 8

CONFIGURATION OF POLARITY PATTERN CONTROLLING PORTION 32



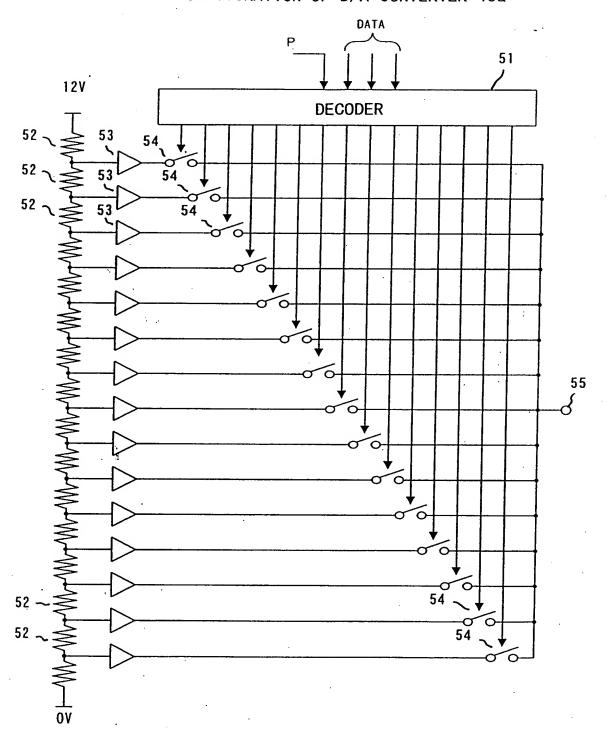
DISPLAY PANEL DRIVING METHOD, DISPLAY PANEL...
Hiraki et al. Our File No.: 1508.68361
Divisional of Serial No. 09/428,324
Greer, Burns & Crain, Ltd. (Patrick G. Burns) (312) 360-0080
Sheet 9 of 51

FIG. 9



DISPLAY PANEL DRIVING METHOD, DISPLAY PANEL...
Hiraki et al.
Our File No.: 1508.68361
Divisional of Serial No. 09/428,324
Greer, Burns & Crain, Ltd. (Patrick G. Burns) (312) 360-0080
Sheet 10 of 51

 $FIG.\ 10$ CONFIGURATION OF D/A CONVERTER 46a



DISPLAY PANEL DRIVING METHOD, DISPLAY PANEL...
Hiraki et al. Our File No.: 1508.68361
Divisional of Serial No. 09/428,324
Greer, Burns & Crain, Ltd. (Patrick G. Burns) (312) 360-0080
Sheet 11 of 51

FIG. 11

INPUT/OUTPUT OF DECODER 51

DECODER	R 1	NPL	ΙT					DI	ECC	DDE	R	ΟU	TP	UT					D/	A CONVERTER OUTPUT
0	1 1	1	7	[1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0) + V 7
0	1 1	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	+∨6
0 1	1 0	1]	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	† + V 5
0 1	1 0	0]	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0] + V 4
0 0)] 1	1]	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	+ V 3
0 0) 1	0]	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	+ V 2
0 0				0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	+ V 1
0 0	0 0	0		0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	+ V 0
1 0	0 (0		0	0	0	0	0	0	0	0	1	0.	0	0	0	0	0	0	-∨ 0
1 0	0 0	1		0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	- V 1
1 0) 1	0		0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	- V 2
1 0) [1	1		0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	- V 3
1 1	0	0		0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	- V 4
1 1	0	1		0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	- V 5
11	1	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	. — ∨ 6
1 1	1	1		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	- V 7

DISPLAY PANEL DRIVING METHOD, DISPLAY PANEL...

Hiraki et al.

Our File No.: 1508.68361

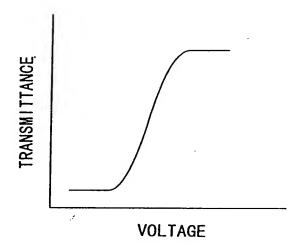
Divisional of Serial No. 09/428,324

Greer, Burns & Crain, Ltd. (Patrick G. Burns) (312) 360-0080

Sheet 12 of 51

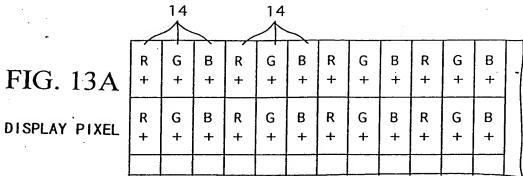
FIG. 12

VOLTAGE-TRANSMITTANCE CHARACTERISTIC



DISPLAY PANEL DRIVING METHOD, DISPLAY PANEL... Hiraki et al. Our File No.: 1508.68361 Divisional of Serial No. 09/428,324 Greer, Burns & Crain, Ltd. (Patrick G. Burns) (312) 360-0080 Sheet 13 of 51

EXAMPLE OF POLARITY PATTERN (1)



14 14 G В R G R G В R G FIG. 13B + + + + + + G G G G В DISPLAY PIXEL В R В R В

		14			14								
		\triangle			1								
	R	G	В	R	G	В	R	G	В	·R	G	В	
FIG. 13C	+	_	+		+	-	+	-	+	_	+	-	
DICDLAY DIVE	R	G	В	R	G	В	R	G	В	R	G	В	
DISPLAY PIXEL	+	1	+	1	+	_	+	1	+		+		

	·	14			14								
	R	G	В	R	G	В	R	G	В	R	G	В	
FIG. 13D		-	+	-	+	-	+		+	_	+	-	
51051 11/ 511/5	R	G	В	R	G	В	R	G	В	R	G	В	
DISPLAY PIXEL	_·	+	_	+	-	+	_	+	_	+	_	+	

DISPLAY PANEL DRIVING METHOD, DISPLAY PANEL...
Hiraki et al. Our File No.: 1508.68361
Divisional of Serial No. 09/428,324
Greer, Burns & Crain, Ltd. (Patrick G. Burns) (312) 360-0080
Sheet 14 of 51

FIG. 14

EXAMPLE OF POLARITY PATTERN (2)

DISPLAY PIXEL

										14		
· 			,							1		
R +	G +.	B -	R -	G +	B +	R –	G -	B + -	R +	G -	B -	
R -	G -	В +	R +	G -	B -	R +	G +	B -	R –	G +	B +	

CASE OF ODD-NUMBERED FRAME

DISPLAY PIXEL

										A		
R	G	В	R	G	В	R	G	В	R	G	В	<u> </u>
_	_	+	+	_	_	+	+	_	_	+	+	
R		Б		_			_		_			
+	G	В	R	G	В	R	G	B	R	G	В	
								T	-		_	
اــــا												١,

CASE OF EVEN-NUMBERED FRAME

DISPLAY PANEL DRIVING METHOD, DISPLAY PANEL...
Hiraki et al. Our File No.: 1508.68361
Divisional of Serial No. 09/428,324
Greer, Burns & Crain, Ltd. (Patrick G. Burns) (312) 360-0080
Sheet 15 of 51

DISPLAY PATTERN

FIG. 15A

DISPLAY PIXEL

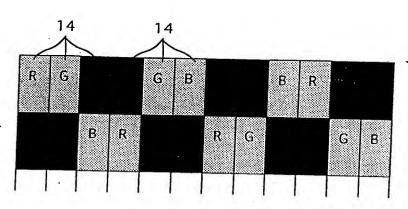
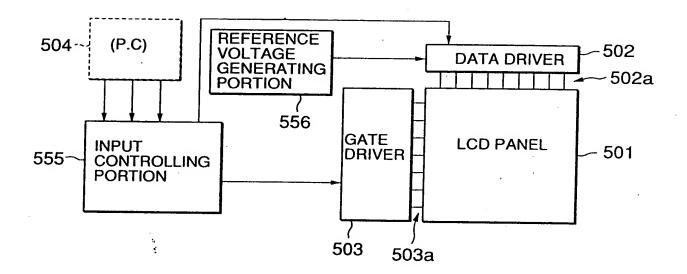


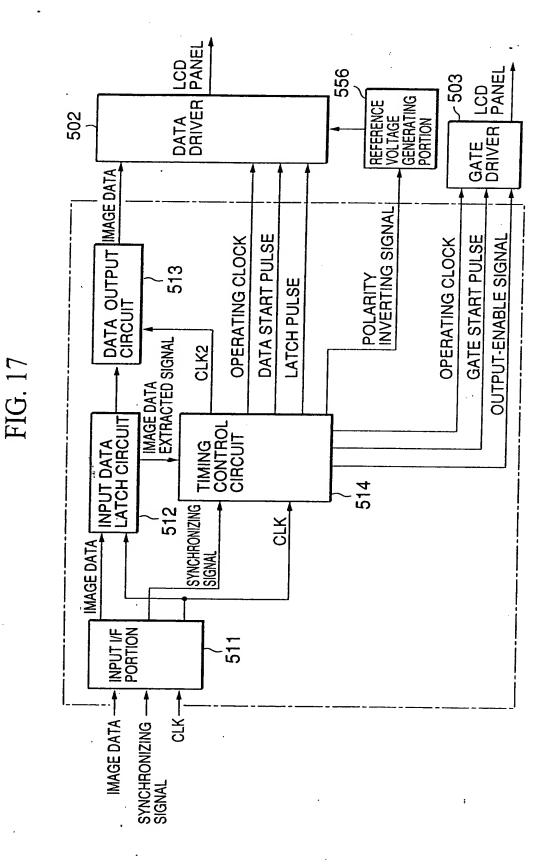
FIG. 15B

DARK YELLOW	DARK SKY BLUE	DARK BLUE	DARK RED
DARK BLUE	DARK RED	DARK YELLOW	DARK SKY BLUE

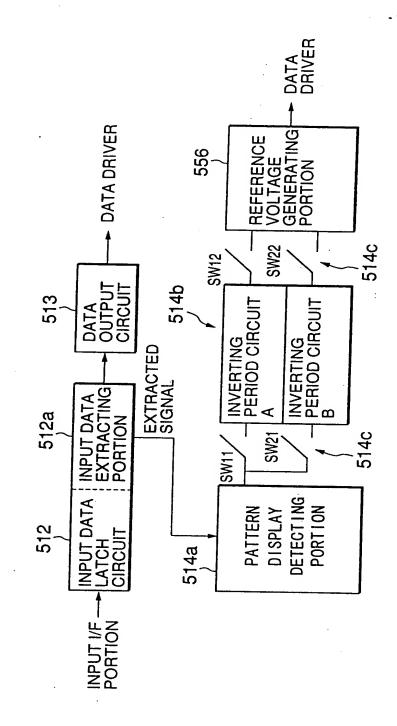
DISPLAY PANEL DRIVING METHOD, DISPLAY PANEL...
Hiraki et al.
Our File No.: 1508.68361
Divisional of Serial No. 09/428,324
Greer, Burns & Crain, Ltd. (Patrick G. Burns) (312) 360-0080
Sheet 16 of 51

FIG. 16



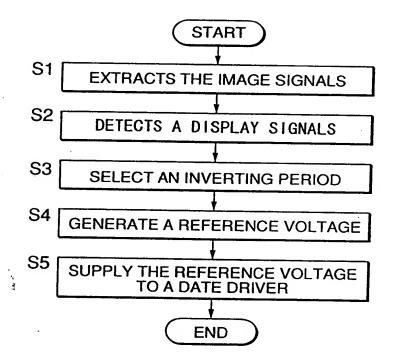


DISPLAY PANEL DRIVING METHOD, DISPLAY PANEL...
Hiraki et al.
Our File No.: 1508.68361
Divisional of Serial No. 09/428,324
Greer, Burns & Crain, Ltd. (Patrick G. Burns) (312) 360-0080
Sheet 18 of 51



DISPLAY PANEL DRIVING METHOD, DISPLAY PANEL...
Hiraki et al. Our File No.: 1508.68361
Divisional of Serial No. 09/428,324
Greer, Burns & Crain, Ltd. (Patrick G. Burns) (312) 360-0080
Sheet 19 of 51

FIG. 19



DISPLAY PANEL DRIVING METHOD, DISPLAY PANEL... Hiraki et al. Our File No.: 1508.68361

Divisional of Serial No. 09/428,324

Greer, Burns & Crain, Ltd. (Patrick G. Burns) (312) 360-0080

Sheet 20 of 51

FIG. 20A

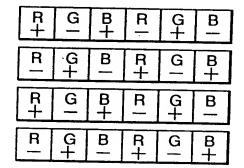


FIG. 20C

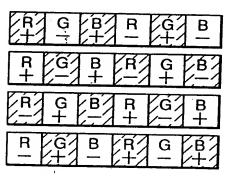


FIG. 20B

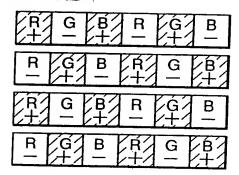
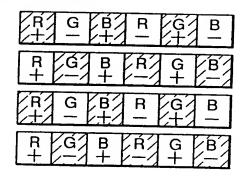
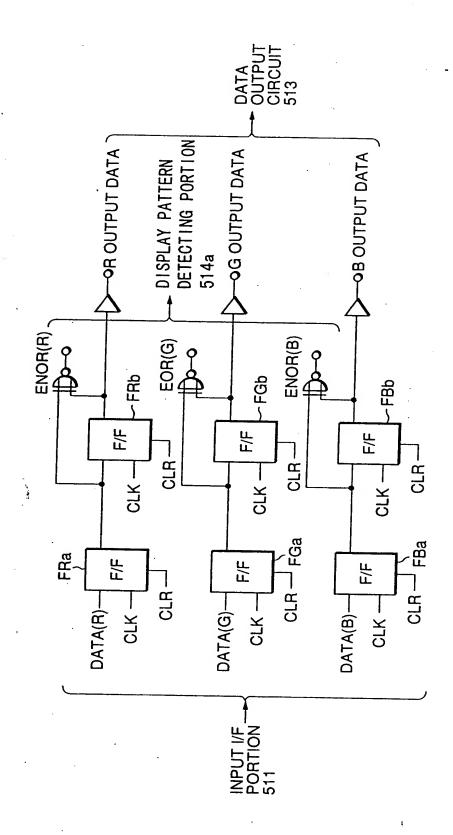


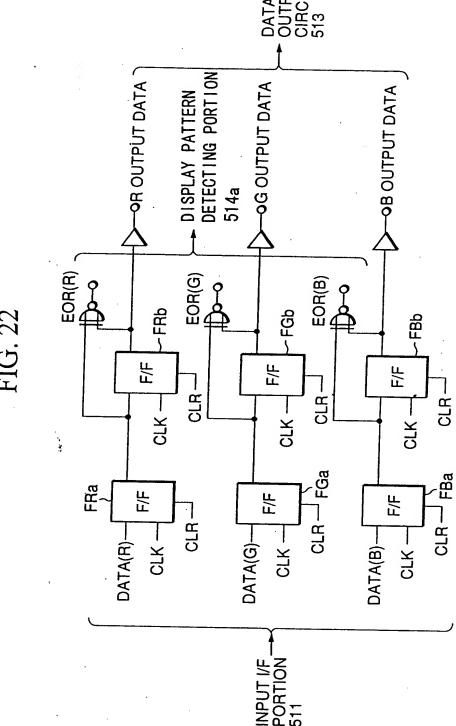
FIG. 20D

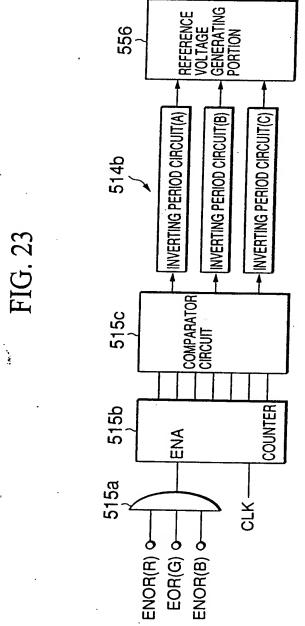


DISPLAY PANEL DRIVING METHOD, DISPLAY PANEL... Hiraki et al. Our File No.: 1508.68361 Divisional of Serial No. 09/428,324 Greer, Burns & Crain, Ltd. (Patrick G. Burns) (312) 360-0080 Sheet 21 of 51



716 21





DISPLAY PANEL DRIVING METHOD, DISPLAY PANEL...

Hiraki et al.

Our File No.: 1508.68361

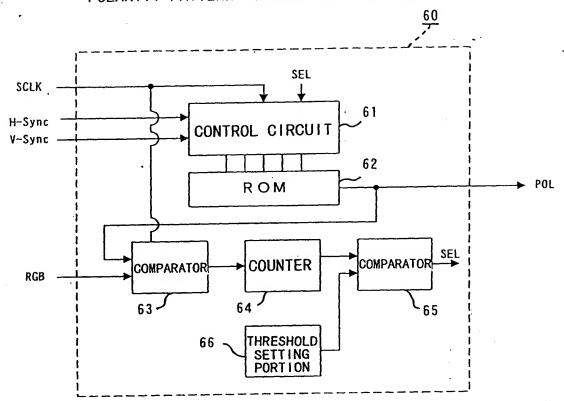
Divisional of Serial No. 09/428,324

Greer, Burns & Crain, Ltd. (Patrick G. Burns) (312) 360-0080

Sheet 24 of 51

FIG. 24

POLARITY PATTERN CONTROLLING PORTION

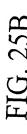


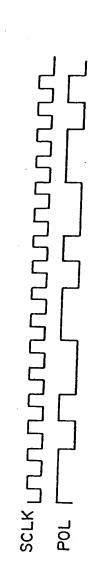
DISPLAY PANEL DRIVING METHOD, DISPLAY PANEL...
Hiraki et al. Our File No.: 1508.68361
Divisional of Serial No. 09/428,324 Greer, Burns & Crain, Ltd. Sheet 25 of 51 (Patrick G. Burns) (312) 360-0080

EXAMPLE OF POLARITY PATTERN (3)

1	2	1
07 08 09 010 011 012 013 014 015 016	+	
9	1	1
04	+	1
033	+	1
129	1	1
=	1	
8	+	
60	ı	
8	+	
20	+	
90	1	
05	1	
04	+	
01 02 03 04 05 06 07 0	-	
02	+	
0	+	
OUTPUT	POLARITY	

POLARITY PATTERN SIGNAL (POL)





DISPLAY PANEL DRIVING METHOD, DISPLAY PANEL...

Hiraki et al.

Our File No.: 1508.68361

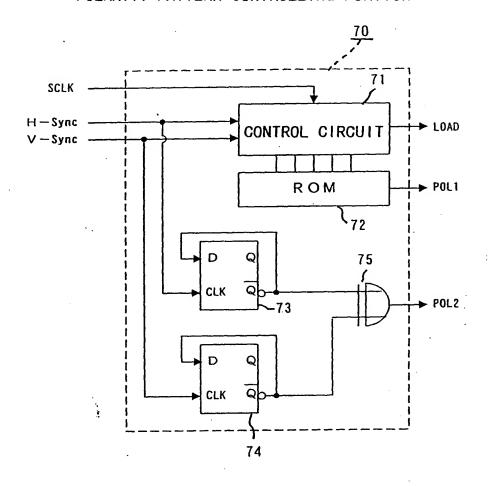
Divisional of Serial No. 09/428,324

Greer, Burns & Crain, Ltd. (Patrick G. Burns) (312) 360-0080

Sheet 26 of 51

FIG. 26

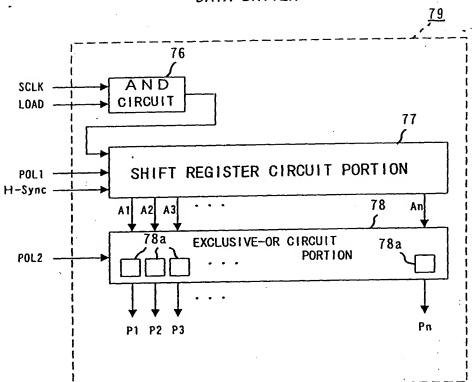
POLARITY PATTERN CONTROLLING PORTION



DISPLAY PANEL DRIVING METHOD, DISPLAY PANEL...
Hiraki et al. Our File No.: 1508.68361
Divisional of Serial No. 09/428,324
Greer, Burns & Crain, Ltd. (Patrick G. Burns) (312) 360-0080
Sheet 27 of 51

FIG. 27

DATA DRIVER



DISPLAY PANEL DRIVING METHOD, DISPLAY PANEL...
Hiraki et al.
Our File No.: 1508.68361
Divisional of Serial No. 09/428,324
Greer, Burns & Crain, Ltd. (Patrick G. Burns) (312) 360-0080
Sheet 28 of 51

FIG. 28

TIMING CHART (3)

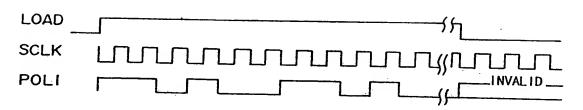


FIG. 29 EXAMPLE OF POLARITY PATTERN

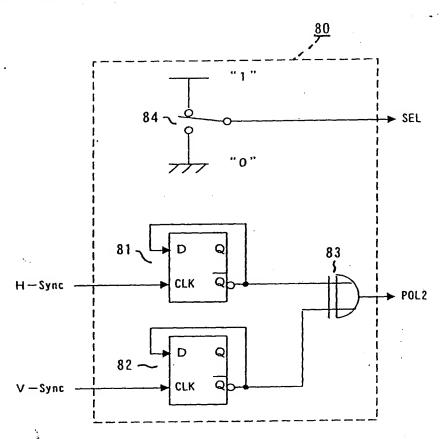
ОИТ	PUT		01	02	03	04	05	06	07	80	09	010	011	012
POLARITY	POL2	0	+	+	1	+	-	-	+	+	-	+	-	_
		1	-	_	+	_	+	+	_	_	+	-	+	+

FIG. 30 VOLTAGE APPLIED TO PIXEL

		14	1									
		1	7					*				
DISPLAY PIXEL	R	G	В	R	G	В	R	G	В	R	G	В
	+	+	_	+	_	-	+	+	-	+	-	_
	R	G	В	R	G	В	R	G	В	R	G	В
·	_	-	+	-	+	+		_	+		+	+
	!!!	ı	- 1									

DISPLAY PANEL DRIVING METHOD, DISPLAY PANEL...
Hiraki et al. Our File No.: 1508.68361
Divisional of Serial No. 09/428,324
Greer, Burns & Crain, Ltd. (Patrick G. Burns) (312) 360-0080
Sheet 29 of 51

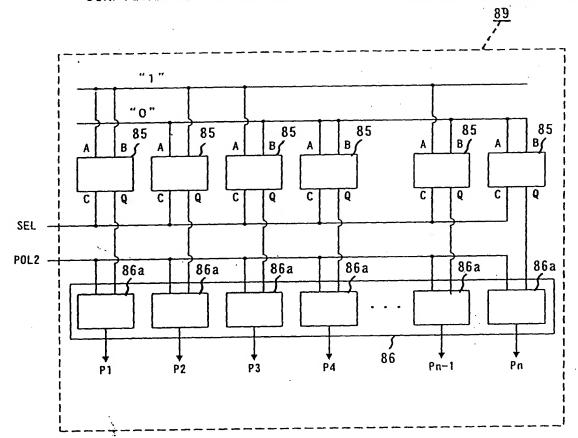
FIG. 31
- CONFIGURATION OF POLARITY PATTERN CONTROLLING PORTION



DISPLAY PANEL DRIVING METHOD, DISPLAY PANEL...
Hiraki et al. Our File No.: 1508.68361
Divisional of Serial No. 09/428,324
Greer, Burns & Crain, Ltd. (Patrick G. Burns) (312) 360-0080
Sheet 30 of 51

FIG. 32

CONFIGURATION OF POLARITY PATTERN CONTROLLING PORTION



DISPLAY PANEL DRIVING METHOD, DISPLAY PANEL...
Hiraki et al.
Our File No.: 1508.68361 Hiraki et al. Our File No.: 1508.6
Divisional of Serial No. 09/428,324
Greer, Burns & Crain, Ltd. (Patrick G. Burns)
Sheet 31 of 51

FIG. 33

INPUT/OUTPUT OF LOGIC CIRCUIT

	T	T	Γ
Α	В	С	Q
1	1	0	1
0	1	0	0
1	0	0	1
0	0	0	0

Α	В	С	Q
1	1	1	7
0	1	1	1
1	0	1	0
0	0	1	0

DISPLAY PANEL DRIVING METHOD, DISPLAY PANEL...
Hiraki et al.
Our File No.: 1508.68361
Divisional of Serial No. 09/428,324
Greer, Burns & Crain, Ltd. (Patrick G. Burns) (312) 360-6
Sheet 32 of 51

FIG. 34A

POLARITY INVERSION IN SEL=0

n	CDI	**	ъ.		
$\boldsymbol{\nu}$	ISPL	.AY	PI	X I-I	

R	G	В	R	G	В	R	G	В	R	G	В
+		+	_	+	-	+	_	+	_	+	_
R	G	В	R	G	В	R	G	В	R	G	В
	+	_	+		+	_	+	-	+	_	+
	1		.		l						

FIG. 34B

POLARITY INVERSION IN SEL=1

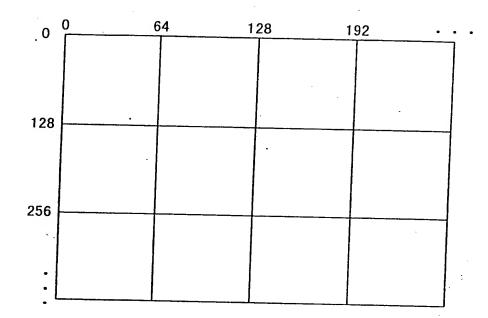
DISPLAY PIXEL

	R +	G +	B -	R -	G ₊	B +	R –	G -	B +	R +	G _	B -
	R -	G -	B +	R +	G –	B -	R +	G +	B 	R -	G +	B +
Ì										-		

DISPLAY PANEL DRIVING METHOD, DISPLAY PANEL...
Hiraki et al. Our File No.: 1508.68361
Divisional of Serial No. 09/428,324
Greer, Burns & Crain, Ltd. (Patrick G. Burns) (312) 360-0080
Sheet 33 of 51

FIG. 35

BLOCK PARTITION OF SCREEN



DISPLAY PANEL DRIVING METHOD, DISPLAY PANEL...
Hiraki et al. Our File No.: 1508.68361
Divisional of Serial No. 09/428,324
Greer, Burns & Crain, Ltd. (Patrick G. Burns) (312) 360-0080
Sheet 34 of 51

FIG. 36A

FIRST POLARITY PATTERN

+	<u> </u>	+	_	+	-	+	-
<u>_</u>	+	_	+	_	+	_	+
+		+	_	+		+	_
_	+	_	+		+	_	+
+	_	+	_	+	_	+	_

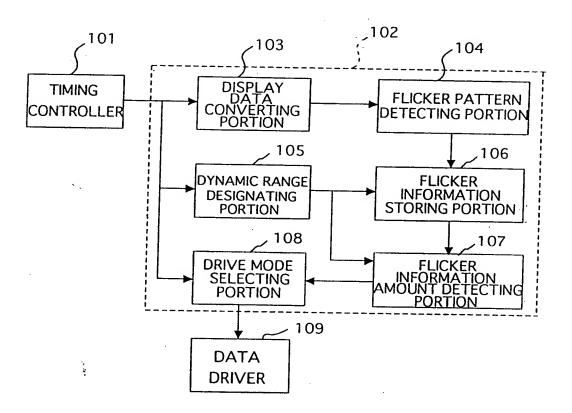
FIG. 36B

SECOND POLARITY PATTERN

+	_	+	-	+	T —	+	<u> </u>
+	_	+		+	_	+	-
	+		+	_	+		+
. —	+		+		+		+
+	_	+	_	+	_	+	

DISPLAY PANEL DRIVING METHOD, DISPLAY PANEL...
Hiraki et al. Our File No.: 1508.68361
Divisional of Serial No. 09/428,324
Greer, Burns & Crain, Ltd. (Patrick G. Burns) (312) 360-0080
Sheet 35 of 51

FIG. 37
LIQUID CRYSTAL DISPLAY PANEL DRIVE CIRCUIT



DISPLAY PANEL DRIVING METHOD, DISPLAY PANEL...

Hiraki et al. Our File No.: 1508.68361

Divisional of Serial No. 09/428,324

Greer, Burns & Crain, Ltd. (Patrick G. Burns) (312) 360-0080

Sheet 36 of 51

FIG. 38
DISPLAY DATA CONVERTING PORTION

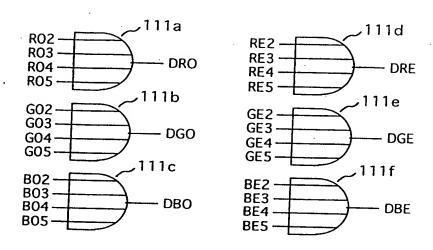
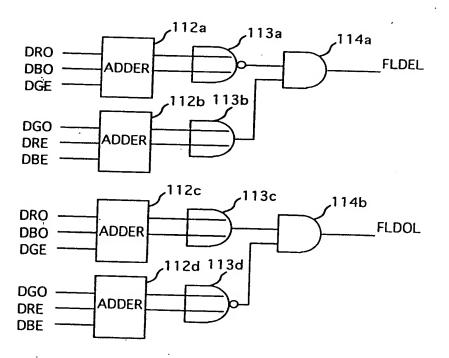
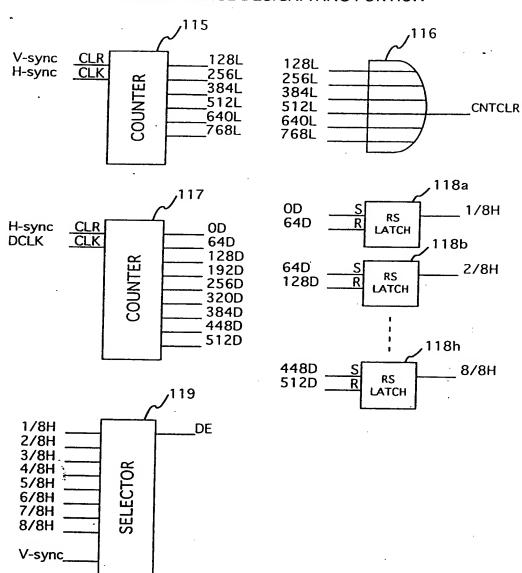


FIG. 39 FLICKER PATTERN DETECTING



DISPLAY PANEL DRIVING METHOD, DISPLAY PANEL...
Hiraki et al.
Our File No.: 1508.68361
Divisional of Serial No. 09/428,324
Greer, Burns & Crain, Ltd. (Patrick G. Burns) (312) 360-0080
Sheet 37 of 51

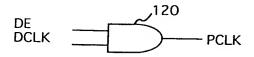
FIG. 40 DYNAMIC RANGE DESIGNATING PORTION

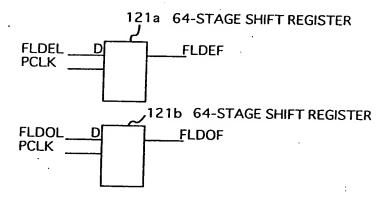


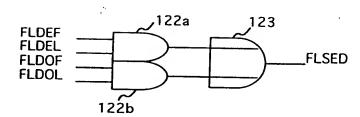
DISPLAY PANEL DRIVING METHOD, DISPLAY PANEL...
Hiraki et al. Our File No.: 1508.68361
Divisional of Serial No. 09/428,324
Greer, Burns & Crain, Ltd. (Patrick G. Burns) (312) 360-0080
Sheet 38 of 51

FIG. 41

FLICKER INFORMATION STORING PORTION







* 91143m. p.

DISPLAY PANEL DRIVING METHOD, DISPLAY PANEL...
Hiraki et al. Our File No.: 1508.68361
Divisional of Serial No. 09/428,324
Greer, Burns & Crain, Ltd. (Patrick G. Burns) (312) 360-0080
Sheet 39 of 51

FIG. 42 FLICKER INFORMATION STORING PORTION

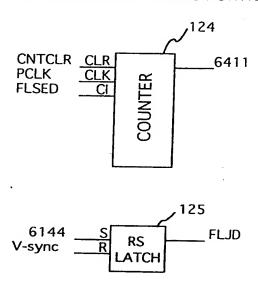
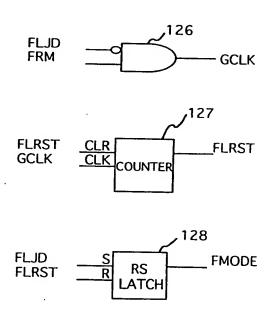


FIG. 43
DRIVE MODE SELECTING PORTION



DISPLAY PANEL DRIVING METHOD, DISPLAY PANEL...
Hiraki et al. Our File No.: 1508.68361
Divisional of Serial No. 09/428,224
Greer, Jurns & Crain, Ltd. (Patrick G. Burns) (312) 360-0080
Sheet 40 of 51

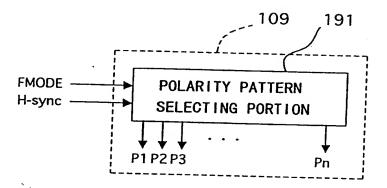
FLICKER PATTERN DECISION

FIG. 44A O X O X O X

FIG. 44B | x | 0 | x | 0 | x | 0

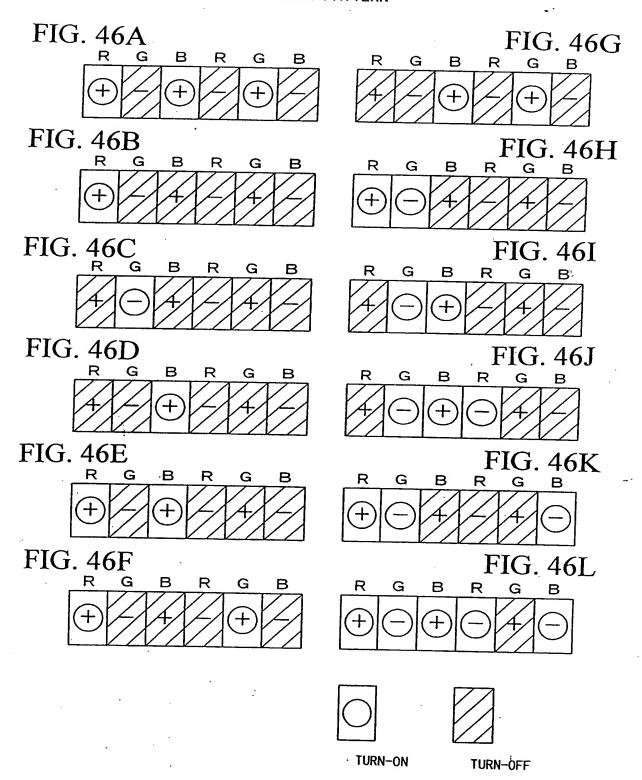
DISPLAY PANEL DRIVING METHOD, DISPLAY PANEL...
Hiraki et al. Our File No.: 1508.68361
Divisional of Serial No. 09/428,324
Greer, Burns & Crain, Ltd. (Patrick G. Burns) (312) 360-0080
Sheet 41 of 51

FIG. 45
DATA DRIVER



DISPLAY PANEL DRIVING METHOD, DISPLAY PANEL...
Hiraki et al.
Our File No.: 1508.68361
Divisional of Serial No. 09/428,324
Greer, Burns & Crain, Ltd. (Patrick G. Burns) (312) 360-0080
Sheet 42 of 51

FLICKER PATTERN



DISPLAY PANEL DRIVING METHOD, DISPLAY PANEL...
Hiraki et al.
Our File No.: 1508.68361
Divisional of Serial No. 09/428,324
Greer, Burns & Crain, Ltd. (Patrick G. Burns) (312) 360-0080
Sheet 43 of 51

EXAMPLE OF FLICKER PATTERN AND EXCEPTION PATTERN

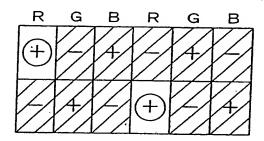


FIG. 47A

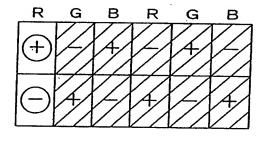
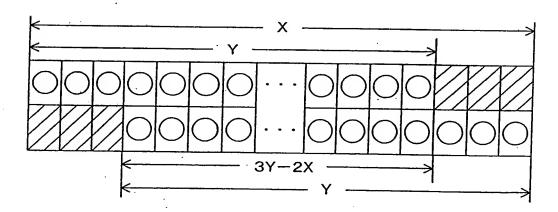


FIG. 47B

FIG. 48
VERTICAL-STRIPED PATTERN DECISION



DISPLAY PANEL DRIVING METHOD, DISPLAY PANEL... Hiraki et al. Our File No.: 1508.68361 Divisional of Serial No. 09/428,324 Greer, Burns & Crain, Ltd. (Patrick G. Burns) (312) 360-0080 Sheet 44 of 51

FIG. 49
2-DOT CHECKER PATTERN

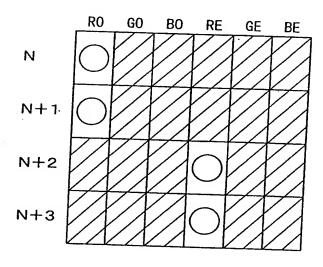
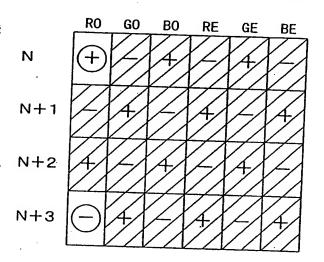


FIG. 50 EXAMPLE OF SPECIAL PATTERN



DISPLAY PANEL DRIVING METHOD, DISPLAY PANEL...
Hiraki et al. Our File No.: 1508.68361
Divisional of Serial No. 09/428,324
Greer, Burns & Crain, Ltd. (Patrick G. Burns) (312) 360-0080
Sheet 45 of 51

FIG. 51

VERTICAL LINE INVERTED POLARITY PATTERN

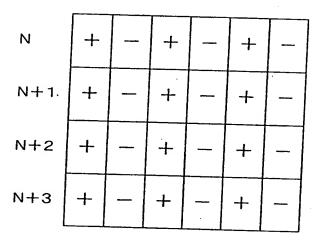
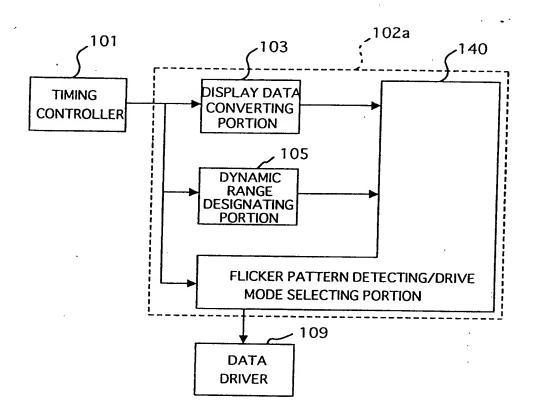


FIG. 52
HORIZONTAL LINE INVERTED POLARITY PATTERN

N	+	+	+	+	+	+	
N+1	_	_			-		
N+2	+	+	+	+	+	+	
N+3			-				

DISPLAY PANEL DRIVING METHOD, DISPLAY PANEL...
Hiraki et al. Our File No.: 1508.68361
Divisional of Serial No. 09/428,324
Greer, Burns & Crain, Ltd. (Patrick G. Burns) (312) 360-0080
Sheet 46 of 51

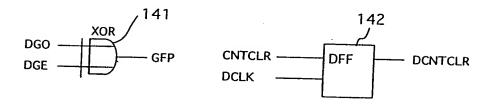
FIG. 53
LIQUID CRYSTAL DISPLAY PANEL DRIVER CIRCUIT

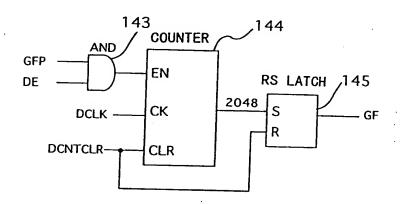


DISPLAY PANEL DRIVING METHOD, DISPLAY PANEL...
Hiraki et al. Our File No.: 1508.68361
Divisional of Serial No. 09/428,324
Greer, Burns & Crain, Ltd. (Patrick G. Burns) (312) 360-0080
Sheet 47 of 51

FIG. 54

FLICKER PATTERN DETECTING/DRIVE MODE SELECTING PORTION (No. 1)





DISPLAY PANEL DRIVING METHOD, DISPLAY PANEL....
Hiraki et al.
Our File No.: 1508.68361
Divisional of Serial No. 09/428,324
Greer, Burns & Crain, Ltd. (Patrick G. Burns) (312) 360
Sheet 48 of 51 (312) 360-0080

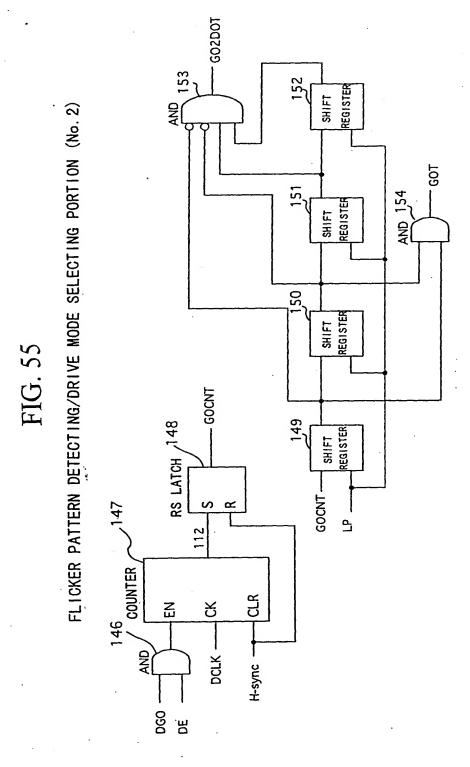
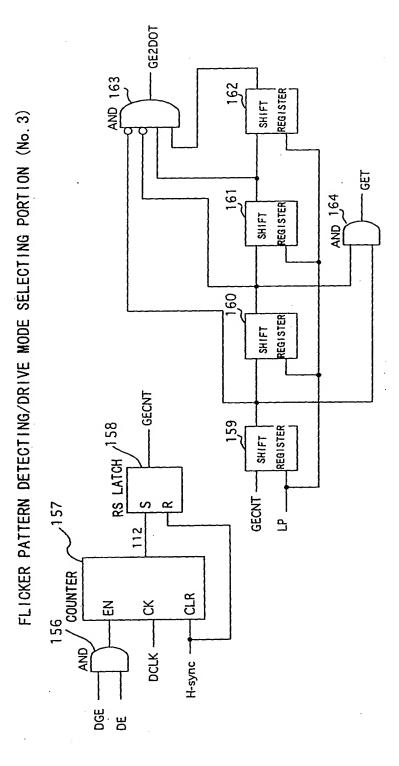


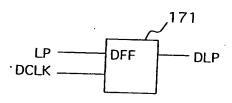
FIG. 56

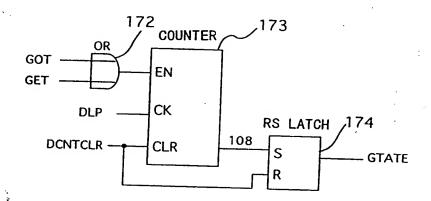


DISPLAY PANEL DRIVING METHOD, DISPLAY PANEL...
Hiraki et al. Our File No.: 1508.68361
Divisional of Serial No. 09/428,324
Greer, Burns & Crain, Ltd. (Patrick G. Burns) (312) 360-0080
Sheet 50 of 51

FIG. 57

FLICKER PATTERN DETECTING/DRIVE MODE SELECTING PORTION (No. 4)





DISPLAY PANEL DRIVING METHOD, DISPLAY PANEL...
Hiraki et al. Our File No.: 1508.68361
Divisional of Serial No. 09/428,324
Greer, Burns & Crain, Ltd. (Patrick G. Burns) (312) 360-0080
Sheet 51 of 51

FIG. 58

FLICKER PATTERN DETECTING/DRIVE MODE SELECTING PORTION (No. 5)

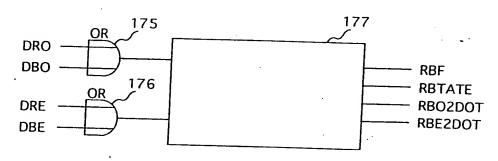


FIG. 59
FLICKER PATTERN DETECTING/DRIVE MODE
SELECTING PORTION (No. 6)

